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Catalogue of 1576 Stars are particularly valuable, several new classes having been introduced. Amongst these may be mentioned the results of the observations necessary to complete the list of all stars visible at Greenwich between the first and fourth magnitudes (with very rare and accidental exceptions); of a list of about 140 stars, to be used in addition to those given in the *Nautical Almanac*, for the determination of clock-error; of stars in the constellation *Canis Major* compared with *Sirius* for the purpose of more accurately determining the variability of the proper motion of the latter star; of about thirty stars near the north pole arranged in pairs differing by nearly 12 hours in right ascension, useful for determining azimuthal errors; and, finally, of such stars as have conspicuous proper motions.

Occultations of Stars by the Moon. Observed by Capt. Noble.

Friday, November 19th.

μ Arietis. The star disappeared instantaneously at 4ʰ 22ᵐ 18ˢ·8 L.S.T.
The reappearance was not seen.

Monday, November 22d.

136 Tauri. The star disappeared at 2ʰ 8ᵐ 37ˢ·5 L.S.T.
And reappeared at 3 13 38·8 L.S.T.

The star entered into contact somewhat sluggishly, and the brightness of the moon was almost overpowering; notwithstanding which the disappearance was well seen. The emersion was perfectly instantaneous.

The telescope employed in each case was my Ross equatoreal of 4·2 inches' aperture, with a power of 115, adjusted on the respective stars.

Observatory, Forest Lodge, Maresfield, Sussex,
9th December, 1858.

Physical Observations of Comet V., 1858. By E. B. Powell, Esq.

Donati's Comet was first noticed at Madras on September 30th, when it was seen through breaks in the clouds shortly after sunset. On succeeding evenings it gained rapidly in brilliancy, becoming a truly magnificent object. My equatoreal not having arrived from England, I resolved to try how closely I could determine the comet's path by means of sextant observations, and accordingly took the following measures with

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a good 8-inch instrument by Troughton and Simms, graduated on platinum to 10″; and I am in hopes that the care I expended upon the work will have prevented the error on any distance from rising above 1′.

Greenwich Mean Time.	Comet to * A ° ′ ″	Comet to * B ° ′ ″	Comet's R.A. h m s	Comet's N.P.D. ° ′ ″
Oct. 3·0583	8 16 17	13 7 35		
4·05139	4 46 12	11 24 35	13 52 54	67 10 6
8·05	11 48 37	19 12 42	14 42 47	78 43 24
12·06875	9 42 52	8 8 54	15 31 13	92 43 42
16·05624	10 35 9	5 25 4	16 13 39	105 39 23
27·05903	2 6 0	2 37 25	17 33 59	126 19 55
Nov. 4·05556	8 30 50	16 55 34		

Greenwich Mean Time.	Comet's Geoc. Long. ° ′ ″	Comet's Geoc. Lat. ° ′ ″	* A	* B
Oct. 3·0583	...	...	Arcturus	ε Bootis
4·05139	196 48 45	31 58 14 (+)	Arcturus	ε Bootis
8·05	214 22 50	25 43 8 (+)	Arcturus	α Cor. Bor.
12·06875	231 7 2	15 51 9 (+)	α Serpentis	β Libræ
16·05624	244 20 48	5 29 24 (+)	Antares	β Scorpii
27·05903	264 37 35	12 59 25 (−)	35 Scorpii	κ Scorpii
Nov. 4·05556			ε Sagittarii	Venus

The difference of longitude between Madras and Greenwich was taken at $5^h\ 21^m$.

On all the dates except November 4th, the observations for the star A were taken in two sets; one before the measures for the star B, the other after, in order that the mean distances might be reduced to the same instant. To clear the resulting right ascension and north polar distance of the comet from refraction, I calculated* the errors in R.A. and N.P.D. on the catalogue places of the stars for the moment of observation, added them to the true R.A. and N.P.D., then worked out the apparent R.A. and N.P.D. of the comet, and finally applied to these last the appropriate corrections. Pontécoulant's modification of Laplace's method of approximating to the perihelion distance, and the epoch of perihelion passage, were next applied to the observations of the 4th, 8th, and 12th October, and gave approximate values of the fundamental elements. Owing, however, to an error in the reduction of the distances of the comet from the stars of reference on the 12th Oct., which was not detected for three or four days, the values were much

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* In this a table of refractions in hour-angle and north polar distance for Madras, drawn up by Capt. Jacob, proved of service.

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inferior in closeness to the truth to what they would have been if the mistake had not occurred; and consequently a great deal of unnecessary labour was entailed in correcting the fundamental elements. After no fewer than five repetitions of the process of correction, I arrived at the following values, using in this part of the problem the places of the comet for the 4th, 12th, and 27th October:—

Epoch of perihelion passage, Sept. 29·9908 G.M.T.

Perihelion distance	·577974		
	°	′	″
Inclination of orbit to ecliptic ..	63	5	58
Long. of ascending node ..	165	17	52
Long. of perihelion on ecliptic ..	14	26	23

Motion retrograde.

The errors on the parabolic arcs from the 4th to the 12th, and from the 4th to the 27th, are respectively—

$$u - \nu = -7'' \quad \text{and} \quad u' - \nu' = -3''$$

Hence, taking into account the length of the arc described between the 4th and the 27th, which was 53° 42′ 41″, and the telling portion of the orbit to which it belonged, I am induced to hope that the foregoing elements represent the comet's path with considerable accuracy. It would be waste of time to apply corrections for parallax and aberration to sextant observations; the preceding may, therefore, be regarded as the final results of my measures.

I add a few remarks respecting the changes of appearance presented by the comet from day to day.

Oct. 2d. Nucleus large and bright, but ragged; not so bright as *Arcturus*, but considerably brighter than η *Ursæ Majoris*. The eastern or convex edge of the envelope sharper and brighter than the other; the curvature, too, on the following side much greater than on the preceding. The tail extending from two-thirds to three-fourths of the distance to η *Ursæ Majoris*, or about sixteen degrees.

Oct. 3d. Nucleus brighter than ε *Boötis* and α *Coronæ Borealis*, but not so bright as *Arcturus*. The tail brighter and longer than last night, extending very nearly to η *Ursæ Majoris*. About the nucleus a cuspidated body of light visible, with a semicircular edge towards the sun. The following edge of the envelope clear and marked; the preceding faint and indistinct.

Oct. 4th. Nucleus nearly as bright as *Arcturus*, but very ragged; the cuspidated appearance evident; the outline of envelope indistinct even on the upper or following side, showing in this respect a decided change since last night. A dark axial space visible down the envelope for the first time; η *Boötis* lying before the head, and almost in the direction of the tail, which is about 24° long.

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Oct. 8th. Outline of envelope ragged, the tail reaching a little beyond *α Coronæ Borealis.* On the lower side the light shades off almost imperceptibly; on the upper, though ragged, it terminates comparatively abruptly. The darkness down the envelope scarcely so clear as before. Nucleus about as bright as *Mars* or *α Lyræ.* The shape of the envelope bears a resemblance to a pen, being narrow at the head, and after a short space suddenly spreading on the lower side like the feather of a quill.

Oct. 12th. Moonlight. Nucleus nearly but not quite as bright as on the 8th. The tail much longer but fainter; the axial darkness down the envelope not visible.

Oct. 16. Nucleus large and diffused; the convex or (now) southern side of envelope brighter than the other, the light in it appearing to diminish more abruptly, and so to form a greater contrast with the ground of the sky.

Oct. 26th. Envelope evident, but very faint; nucleus large, ragged, and indistinct.

Oct. 27th. Comet very faint; nucleus large and hazy; tail roughly estimated at four or five degrees in length.

In examining the appearance of the comet, use was made of a 3½-foot refractor, with an aperture of 2¾ inches.

Madras, Nov. 13, 1858.

Observations of Comet V., 1858. By R. L. J. Ellery, Esq.

(*Letter to the Astronomer Royal.*)

A large comet made its appearance in these latitudes about the 10th of this month, and continues to increase in brilliancy—its nucleus is about equal to a star of the 1½ magnitude—its tail now extends over about 6°; at its first appearance it was not visible for more than 3°. I inclose herewith a few observations made with an 18-inch altazimuth on the 145th meridian. The observations are merely corrected for index errors and microscopes, each observation is made up of sets with the instrument in reversed positions. We are getting a series of photometric measurements and drawings, which I hope to be able to forward by next mail.

Date.	Object.	Observed Azimuths.	Observed Altitudes.	Barometer.	Temp. Air.	Local Sidereal Time.
		° ′ ″	° ′ ″	Inches.	Fahr.	° ′ ″
Oct. 12	Comet	79 59 37·35	16 5 50·99	29·964	53·0	20 14 30·00
		81 53 49·57	14 2 24·72			20 25 3·00
		84 55 50·30	9 42 20·32			20 47 37·75
		86 31 0·82	8 11 32·60			20 55 30·25
	Antares	97 40 40·20	35 24 7·11			20 37 25·00
		101 35 9·83	29 35 12·66			21 7 17·05